CET442 Lab #3

DHCP Administration Lab

In the previous experiment you set up the IP addressing plan for your company's network, which consisted of both static and dynamic IP addresses. Here you'll continue the IP configuration of dynamic devices (which includes all clients that will connect to your network) by setting up a Dynamic Host Configuration Protocol (DHCP) server. This server will respond to DHCP discovery broadcasts emitted by workstations needing an IP address.

The DHCP service typically supplies at least the following four key pieces of information to clients requesting an IP address:

IP Address: Each device on the network needs to have a unique IP address. The DHCP server keeps track of the IP addresses that it administers to prevent duplicate addresses. Clients are "leased" IP addresses by the DHCP server; the default lease time is typically 7 days. (Of course, clients can release or renew an IP address any time within the lease period.)

Subnet Mask: The subnet mask must be given to the client so that it can properly calculate the network address when needed.

Default Gateway or Router: Clients will use this address to send IP packets to machines outside of the network.

DNS Server Addresse(s): DNS service is required for most Internet-related activities. The DHCP server provides the addresses of two or more DNS machines to the client when parceling out a new client's IP address.

There are other "optional" bits of information that can be added to the DHCP transaction. For example, if your network provides a WINS (Windows Internetwork Name Service) server, you can provide this to clients automatically with DHCP.

Laboratory Procedure

1. Prior to starting this procedure, work out the IP address plan for the network segment to be served by DHCP. Use the plan from the previous experiment if possible.

   For example, suppose that you have the network address range 10.0.1.0/24 available. Because of the subnet attribute, there are 254 host addresses (.1 to .254) available. Perhaps you'll reserve ".1" to ".15" for static IP hosts (such as servers, IP based printers, and so on.) In this case, you'll set up DHCP to give out addresses in the range "10.0.1.32" to "10.0.1.254," eliminating any possible conflicts.

2. Disconnect your bench from the DeVry network.

   WARNING:

   Failure to disconnect your DHCP server from DeVry's network will cause severe disruption to the school network. Your installation will also not work correctly. If your project causes harm to the school's network, the IT department has full rights to subject you to treatment with the **Wouff Hong** (on display in the IT department).

   Only one DHCP server may be on any network physical segment. Therefore, you can not share a hub or switch with any other project group that has DHCP service running (unless that hub or switch can be broken into segments).

3. Log into the Windows 2000 server. Under Administrative Tools choose . You'll see a screen like this:
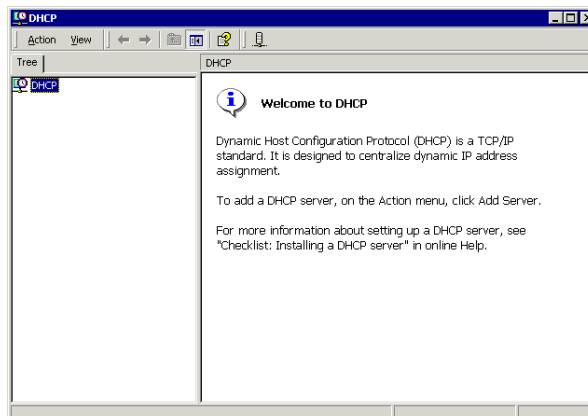
4. Under the Action menu choose "Add Server." In the dialog that results, choose "This server" and type in the NETBIOS name of your computer and click OK, as shown below:
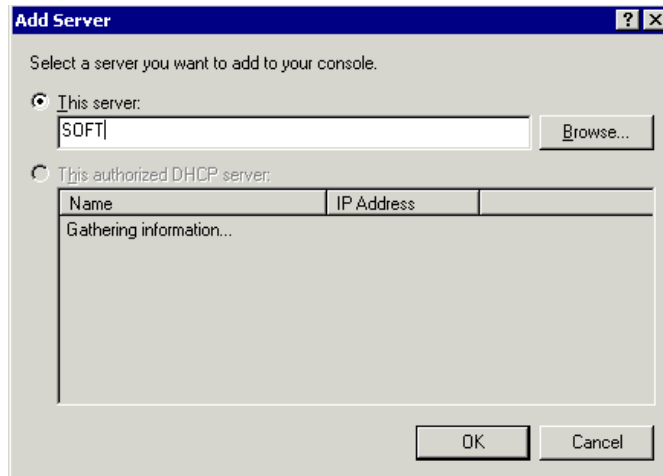
5. Once you've done this, the management console now looks like this (your domain names and IP address ranges will differ):
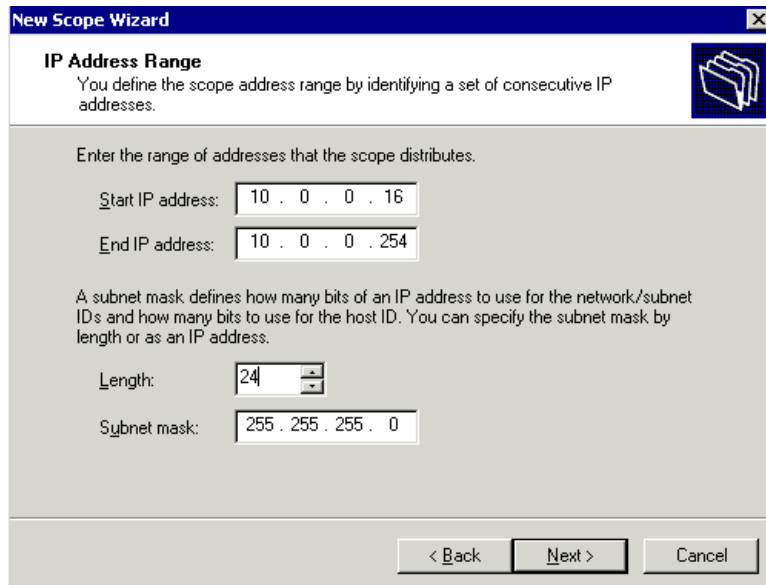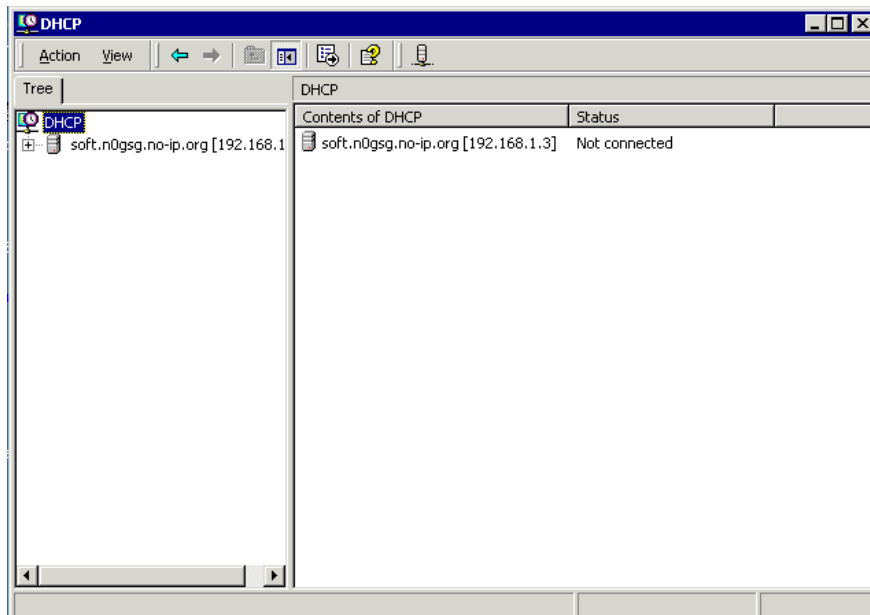

6. Right click on the server name in the left-hand pane and choose "New Scope..." from the pop-up menu.

Note: If you get an error stating that the server can't be found, make sure that you have started the DHCP service. (Go to Administrative Tools -> Services to check.)

7. The New Scope Wizard will appear. Click NEXT.

   Provide the name "Test DHCP Scope" (or any other reasonable name) for the scope. You may also add a comment to document the DHCP zone being created.

   After completing this, you'll see the following dialog:

   Fill in the information according to your IP addressing plan and click NEXT.

8. You'll see a screen for "exclusions." Since you already excluded a range for static IP addresses, you may skip this screen. Click NEXT again.

9. Set the scope lease time as appropriate. Most administrators leave this set to 8 days, which is the default.

10. You will now have to configure the remaining information passed to your DHCP clients. This includes the default gateway (use your server as the IP address), the DNS server address (you again!), and the WINS server address (leave blank). You may leave the parent domain address blank if you wish.

11. Finally, you'll see a screen asking whether you'd like to activate the scope now. Choosing YES will turn on DHCP for your clients to use -- your DCHP service will be on the air!

12. To test DHCP, connect any client computer to your network (even a laptop will do). The client must be set to "automatically obtain an IP address," which means that it wants DHCP. After connecting, start a command line session and type the following command to see the IP configuration of the computer (assuming Windows NT/2000/XP):

```
ipconfig /all
```

13. To force the client to go through the DHCP release and renew process, use the following commands:

    `ipconfig /release`   Releases the current IP address

    `ipconfig /renew`   Asks for a new IP address.

14. Try connecting several clients to your network and observe (and document) the pattern of IP addresses that are parceled out, to verify that things are working correctly. <u>Use Ethereal to follow at least one DHCP transaction</u>:

a) Start Ethereal on a workstation computer that is part of your network. (Don't start capturing packets just yet.)

b) Issue a `ipconfig /release` on this computer, just like in step 13.

c) Tell Ethereal to begin capturing packets (CTRL-K).

d) You guessed it, issue a `ipconfig /renew` and see what happens.

15. Note that your clients can't connect to the outside world, and even a DNS lookup operation will fail, because you haven't started the DNS service yet.

Laboratory Report Checklist:

The following contents are required in the laboratory report for this experiment:

- A table showing the IP Address plan for the network.

- A summary of the DHCP configuration used on the DHCP server. This can be obtained by examining the properties of the DHCP scope you created.

- A description of the procedures used to test the operation of the DHCP service.

- A dump of the results obtained with at least two different clients in steps 12 and 13. Explain what the meaning of the results are.

- A dump and explanation of the results obtained in Step 14.